FIRE DAMP—VENTILATION OF MINES.

ROYAL INSTITUTION.

The first evening meeting in the present year was held on Friday, the 17th instant, when Professor Faraday laid before the members some observations on coal mines, and the accidents to which the miners are liable, with especial reference to what is called the *goaf* of the mine.

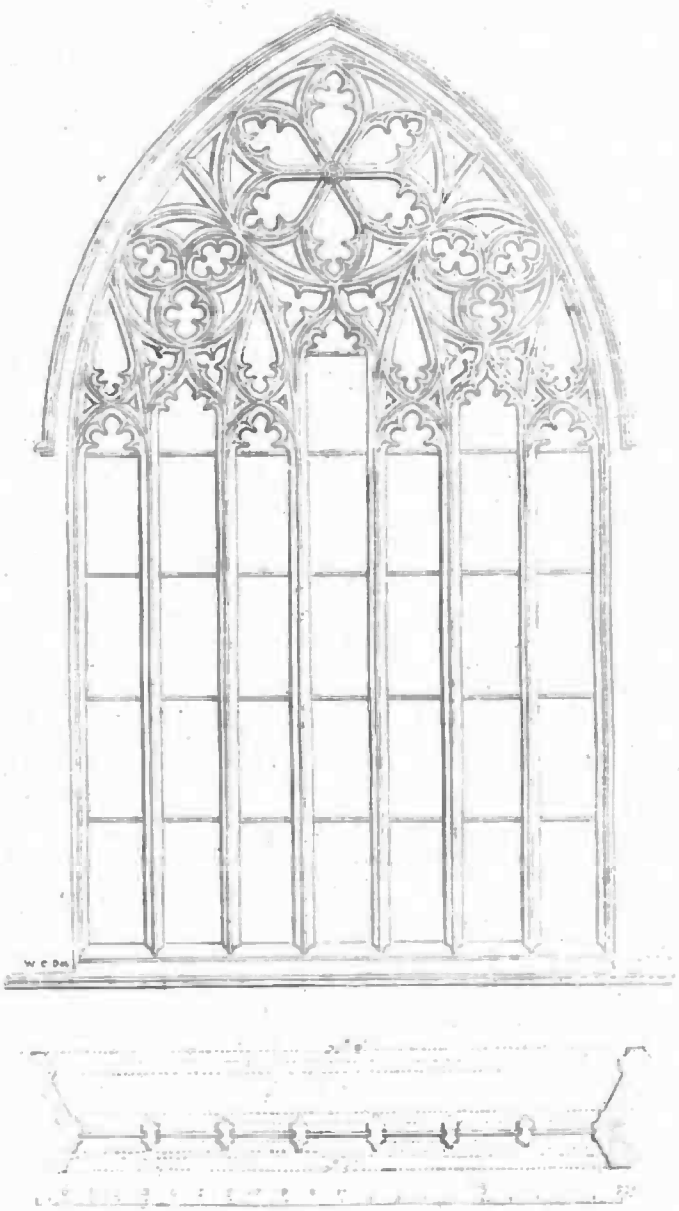
In consequence of the disastrous explosion in the coal mine at Haswell, where 95 men and boys were killed, he had been deputed by Government to proceed there, in conjunction with Mr. Lyell, and to make a report upon it. That report was before the public, and it was with the view of explaining some points in it that he came before them on that occasion. He did not profess to understand coal mines so well as those who had devoted all their time to the subject, but he did profess to understand Nature in some degree, and it was from this circumstance probably that Government had selected him for the inquiry. He would premise that the inquest shewed that no blame attached to any person in the late disaster; all precaution, so far as their knowledge went, had been taken, but certain observations had occurred to Mr. Lyell and himself which, if attended to, might, he thought, have the effect of lessening danger in future. He then described, by means of a black cloth stretched against the wall of the theatre, the appearance of a seam of coal, and the mode of working the mine. He shewed that having sunk a shaft down to the seam (in the present case 900 feet deep), a straight passage 5 yards wide was worked out of it, 25 yards forward; the roof being secured by props. A passage right and left of the same width, was then cut to the same extent, and then again returned right and left, so that ultimately the mine presented a series of masses of coal, 25 yards square, called pillars, each surrounded by a passage or way. They then began to work out one of these masses (the thickness of the seam in question was 4 feet 6 inches); and as they removed the coal, they secured the roof by means of props. When the whole of one pillar had been taken out, as they could not afford to leave the timber supports, they were withdrawn, and the superincumbent earth descended. This was called a goaf, and ultimately presented a heap of ruins of enormous extent. The goaf they examined covered 13 acres (an area once and a half as large as Lincoln's-inn Fields).

Leaving this part of the subject, the professor then described the nature of fire-damp, and shewed its properties by experiments with coal-gas, which, in most respects, resembled it. The gas which exudes in the mines becomes explosive when mixed with atmospheric air in quantities of not less than 5 of air to 1 of gas, or more than 14 of air to one of gas; with less air or more air there is no danger. The professor was of opinion that the coal-dust scattered about was licked up by the rush of air produced, in which case the combustion (as he shewed by experiment) was very different. Fire-damp is exceedingly light, and necessarily ascends to the highest parts. This he exemplified by various experiments, as upon this property was based the proposition he wished to enforce—namely, that the goaf is a receptacle for fire-damp, and by a variety of circumstances may be made to discharge part of its contents into the mine—for example, by change in the density of the atmosphere.

The ventilation of mines was effected by two shafts, in one of which was a furnace; through the rarefaction produced, currents were established which drew off the gas. To shew the size of the furnace at the mine where the accident occurred, he mentioned that a ton of coals was always in combustion. The professor then shewed by experiments with pipes communicating with a fire, how rapidly smoke was carried off in this manner, and urged, as the main object of his lecture, that all goafs should be ventilated as high as was practicable by means of pipes communicating with the furnace. This might be done in most cases at an expense of 50*l*.

There is no lecturer who can invest a simple subject with so much interest as Mr. Faraday, or more completely simplify an abtruse one. His illustrations too, never fail, and are always ready. His audience are not kept waiting while this bottle is filled, or that jar exhausted; preparation and explanation go on together, and the result is perfect.

CENTRE WINDOW IN WEST FRONT OF THE DUTCH CHURCH, AUSTIN FRIARS.



Plan of Window.

GOTHIC DETAILS FROM THE DUTCH CHURCH, AUSTIN FRIARS.*

The centre window in the west front, represented by the accompanying engraving, is a very good example of a window in what is termed the decorated style, which, as a general rule, may be called the architecture of the 14th century. The arch of windows of this style is usually equilateral (not always), and the tracery consists in the earlier specimens, of geometrical forms, circles, trefoils, &c.; and in the later examples is formed by wavy, flowing lines. In the Perpendicular style, which succeeded it, the mullions ran through the head in perpendicular lines, and the tracery took the same character; the arch became flatter, and ultimately lost the pointed form altogether. The perpendicular style in the same general way, as above stated, may be considered to belong to the fifteenth century. In windows of the early English style, which preceded the decorated, the arch, especially in the earliest specimens, is acute, and the opening long and narrow. This style belongs to the thirteenth century.

The window that forms the subject of our illustration is considerably larger than the aisle window figured in the last number of our journal, (as is shewn by the dimensions annexed), but is drawn to a smaller scale. The moulding of the cill is the same in this as in the aisle window; the section of the reveal, with its dimensions, is shewn by the annexed cut.

* See p. 30

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